

REMARKS/ARGUMENTS

Claims 1-34 stand rejected in the outstanding Official Action. Applicants have amended claims 1, 2, 6, 12, 15, 17-19, 28, 32 and 33 and added newly written claims 35-43. Therefore, claims 1-43 are the only claims remaining in this application.

In paragraphs 2-5 of the outstanding Official Action, the drawings have been variously objected to by the Examiner. Specifically, the Examiner suggests that Figure 1 should be designed as "prior art" and a corrected Figure 1 has been submitted as a replacement sheet.

The Examiner has also objected to the drawings, alleging that they fail to show numerous elements described in the specification. The requirement of drawings in U.S. Patent Office applications is not that they show all elements described in the specification, but rather that they show all elements recited in the claims. Applicants' drawings accomplish this required result. However, Applicants have revised the formal drawings in the manner of the replacement sheets. Specifically, Figures 2 and 3 have been modified to utilize labeling from the specification text of the description of the figures, thereby obviating any objection to different language used in the specification and the figures. In particular, element 12 in Figure 2 has been labeled "user defined rules," element 22 in Figure 3 has been labeled "test bench model rules" and element 28 in Figure 3 has been labeled "data file." These changes specifically overcome the Examiner's objections in paragraph 3 of the Official Action.

In paragraph 4, the Examiner suggests that none of the reference characters in Figure 7 are mentioned in the description. Actually, there are no reference characters in Figure 7 and rather Figure 7 comprises a reference simulation and a regression simulation block diagram. Applicants' originally filed specification at page 13, line 7 makes a reference to the flow chart of Figure 7. In order to avoid any further possible difficulty with the Examiner's interpretation of

Figure 7, the language of the elements in Figure 7 has been amended to reflect the exact wording of the text. The device under test (DUT) element of Figure 7 is discussed on page 11 of the description and also on page 15 under the heading "Bidirectional Ports." The regression simulation element is mentioned on page 15 in the third paragraph, but Applicants have amended page 15 to add a further sentence that references the pass/fail element of Figure 7. Therefore, Applicants' replacement sheets and amended specification clearly reflect and discuss the subject matter disclosed in Figure 7.

Applicants have also taken care in preparing the replacement sheets to include clearly legible details, thereby obviating any further objection to the drawings. Entry and consideration of the replacement sheets of drawings is respectfully requested.

The Examiner objects to the Abstract of the Disclosure. Applicants have amended the Abstract to correct the spelling in the title and to delete the reference to Figure 3.

In paragraph 7 of the Official Action, the Examiner objects to the spacing of the lines in the specification and has requested new application papers. Applicants provide herewith a clean copy of the application with the amendment noted above on page 15 (of the originally filed application), but with proper line spacing and in more consistent document format. Applicants have not included the claims with this revised clean copy of the specification, as the pending claims are noted in the amendment to the claims portion of this Amendment.

The Examiner suggests that Applicants' arrangement of the specification is somehow inappropriate. Applicants note that the present application appears to meet the Patent Office specification heading and subheading requirements and therefore clarification of the rejection, if any, is respectfully requested.

In section 9 of the Official Action, claims 1, 17, 19, 21 and 32 are objected to as setting forth essentially a plurality of elements or steps without separating each element or step of the claim by a line indentation. Applicants have reviewed the claims and where appropriate provided an indentation for each of the elements and/or each of the method steps. Entry of the above amendment is believed to obviate any further claim objection under Rule 75(i).

In sections 11-13 of the Official Action, claims 1-17, 28-30 and 34 stand rejected under 35 USC §112 (second paragraph). Specifically, the Examiner in section 12 objects to the phrase “may be.” In the above amendment, the phrase “may be” has been deleted from claims 1, 12, 17 and 28, thereby obviating any further objection thereto.

In section 14 of the Official Action, claim 6 is objected to as lacking positive antecedent basis for the claim term. Claim 6 has been amended to clarify the antecedent basis is “at least one strobed output signal.”

In section 15 of the Official Action, Claim 15 is objected to as lacking specific antecedent basis. Claim 15 has been specifically amended to specify that at least one of the output signals is sampled at the sampling point of a corresponding one of the sampling rules.

In section 16 of the outstanding Official Action, claim 34 is objected to, with the Examiner indicating that it is unclear to him what is meant by the claim. Specifically, Applicants believe at least a portion of the Examiner’s confusion stems from his assumption that the reduced model of claim 1 is in fact a reduced model of hardware. This is not strictly correct, and rather the reduced model of claim 1 is could be a software model, a hardware model or a combination of software and hardware. This is clearly described in Applicants’ originally filed specification at page 8, lines 6-11 describing Figure 3. Applicants believe that given the correct interpretation

of the reduced model feature set out in claim 1, claim 34 makes perfect sense in that a reduced hardware model is synthesized from a reduced model comprising a software component. Those of ordinary skill in the art would understand that a synthesis could be performed using a known circuit modeling tool.

As a result, in view of the amendments and discussions above, it is clear that claims 1-17, 28-30 and 34 meet all requirements of 35 USC §112 and any further objection or rejection thereunder is respectfully traversed.

The Examiner's "claim interpretations" set out in sections 18-23 of the Official Action are very much appreciated, but are believed obviated in view of the amendments and revisions of the claims noted above.

In paragraphs 24-31, the Examiner rejects claims 17, 18 and 32-34 under 35 USC §101 as allegedly being directed to non-statutory subject matter. Applicants have amended the language in claims 17 and 32 to refer to "logic hardware" as opposed to merely "logic" which was objected to by the Examiner. Thus, Applicants' claims now specifically refer to the necessary hardware comprising the apparatus and any further objection or rejection under 35 USC §101 is respectfully traversed.

Regarding claims 18 and 33 directed to computer programs, Applicants have recited that the programs are on a "carrier medium" thereby obviating any further objection. The objection to claim 34 has been previously addressed and amendments to claim 1 are believed to have obviated any further objections to claim 34.

In view of the above amendments and discussion, claims 17, 18 and 32-34 clearly meet the requirements of 35 USC §101 and any further objection or rejection thereunder is respectfully traversed.

Claims 1-5, 12-14, 16-21, 28-30 and 32-34 stand rejected under 35 USC §102 as being anticipated by Gupte (U.S. Patent 5,903,475). Applicants have reviewed the Examiner's allegation suggesting that Gupte discloses each and every structure recited in Applicants' original claim 1. Issue is taken with respect to the Examiner's conclusion that Gupte discloses the "using" step set out in Applicants' claim 1. This portion of claim 1 as originally filed required that the using step form a reduced model to replay the recorded input signals to the subsystem circuit model "without requiring a periodic sampling reference."

The Examiner suggests that this is taught at column 2, lines 7-22 and column 6, lines 41-52 in the Gupte reference. This contention is respectfully traversed. An examination of column 2, lines 7-22 of Gupte establishes that the Gupte system captures "golden" vectors that may be used to test an ASIC during stand-alone simulation and that the outputs generated by the ASIC during such simulations are comparable to the outputs generated during the system simulation itself, i.e., the golden vectors. This has nothing to do with the claimed using step, especially "without requiring a periodic sampling reference."

Column 6, lines 41-52 of Gupte specifies that the customer produces the ASIC design specifications, such as input/output and timing diagrams and that the behavioral specification of the ASIC is simulated within the customer's system environment. The portion of column 6, lines 41-52 simply does not disclose or suggest that the output signals of the sub-system circuit model are tested by using a plurality of sampling rules and "without requiring a periodic sampling reference."

Accordingly, neither of the cited portions of the Gupte reference disclose the aspects of Applicants' "using" step which are positively recited both in the originally filed claim 1 and in claim 1 as amended above. As it is incumbent upon the Examiner to demonstrate how or where

an alleged prior art reference teaches Applicants' claimed method steps, the Examiner has failed to establish a *prima facie* case of anticipation (or even obviousness for that matter) of Applicants' originally submitted claim 1 over the Gupte reference. Because similar language is contained in independent claims 17, 19, 32 and newly written independent claims 35, 40 and 41, all of these claims are patentable over the Gupte reference. Because all other claims depend from these independent claims, they are similarly patentable over the Gupte reference.

It would be clear to one of ordinary skill in the art that the Gupte reference has nothing to do with the claimed invention. Rather than comparing output signals, the Gupte system simply performs a comparison of output vectors captured according to a periodic strobe signal timing with the golden vectors. Gupte is merely a simple cycle based approach as described by the Applicants in the Background of the Invention portion of the specification on page 4

“[c]ompared to a simple cycle based approach in which test vectors are replayed and responses recorded, the reduced model is more flexible and more compact as well as allowing more sophisticated types of analysis. The reduced model does not force any artificial timing restrictions due to cycle based sampling approaches [like Gupte] and tends not to generate the impractically large file sizes that can be associated with cycle based approaches.”

While Applicants have acknowledged that cycle based approaches are well known in the art, Applicants' specification also clearly demonstrates that the more flexible system set out in claim 1 permits a much more sophisticated analysis by providing a sampling of output signals using sampling rules, rather than simply using a periodic sampling reference. Each of the independent claims clearly specifies “without requiring a periodic sampling reference” which clearly distinguishes all independent claims from the required periodic sampling taught in Gupte.

Not only does Gupte fail to teach Applicants' claimed invention in teaching a cycle based approach, Gupte actually teaches away from Applicants' claimed combination of elements and

method steps in its apparatus and method claims. Gupte can only work correctly if the outputs from the simulations are sampled at such time that the outputs are considered stable when sampled. In contrast, the present invention allows a more robust testing system by using sampling rules, rather than a periodic sampling reference, which allows flexibility in checking the output state transitions rather than the Gupte approach of being restricted to pre-determined periodic sampling times.

Thus, the benefit of the present invention is to enable the output signals of the subsystem circuit model to be sampled and compared with predetermined characteristics indicative of correct operation, rather than simply capturing an output vector set which must then be compared with the "golden" vector set as in Gupte. Accordingly, the present claimed invention as set out in Applicants' independent claims is clearly novel and non-obvious in view of the Gupte reference.

Applicants offer a newly written claim 35 which is similar to Applicants' original claim 1 combined with the limitations of originally filed claim 4. The Examiner has suggested that Gupte at column 8, line 44 to column 9, line 8 teaches the subject matter of Applicants' claim 4. However, the cited portion of Gupte discloses that an input/output specification file comprises strobes and provides a particular example of a strobe signal that instructs the simulators to extract output vectors every 20 nanoseconds on particular output signals starting at 19 nanoseconds into the cycle. Thus, this passage of Gupte discloses discrete sampling of an output signal whose timing is controlled by a strobe signal. This has nothing to do with providing an output signal window within which a change in the output signal should occur to be indicative of correct operation. Thus, the subject matter of claim 4 and Applicants' newly written claim 35 is

clearly patentable over the Gupte disclosure. Entry and consideration of newly written claims 35-43 is respectfully requested.

Claims 6-11 and 22-27 stand rejected under 35 USC §103 as unpatentable over Gupte as previously applied. The above comments regarding the Gupte reference are herein incorporated by reference inasmuch as claims 6-11 ultimately depend from claim 1 and claims 22-27 ultimately depend from claim 19. Inasmuch as Gupte does not teach the invention of independent claims 1 and 19 and because Applicants' claims recite "without requiring a periodic sampling reference for said output signal," Gupte actually teaches away from Applicants' claimed combination of elements and method steps. Accordingly, any further rejection of claims 6-11 and 22-27 as being obvious in view of Gupte is respectfully traversed.

Claims 15 and 31 stand rejected under 35 USC §103 as unpatentable over Gupte as previously applied and further in view of Rostoker (U.S. Patent 5,544,067). Inasmuch as claims 15 and 31 depend from claims 1 and 19, respectively, the above comments regarding the Gupte reference failing to teach and in fact teaching away from the claimed combinations is herein incorporated by reference. Moreover, the Examiner's admission and recognition that Gupte "does not teach monitoring output signals other than at sampling points for that output signal" is very much appreciated. This admission clearly confirms Applicants' analysis of the independent claims and the fact that the claim language "without requiring a periodic sampling reference" clearly distinguishes over the Gupte reference.

The Examiner suggests that Rostoker in monitoring output signals somehow supplies the missing teaching in Gupte. However, the Examiner fails to indicate how or why one of ordinary skill in the art would be motivated to disregard Gupte's cycle-based approach and ignore his teaching that a cycle-based approach is required and instead adopt Rostoker's alleged monitoring

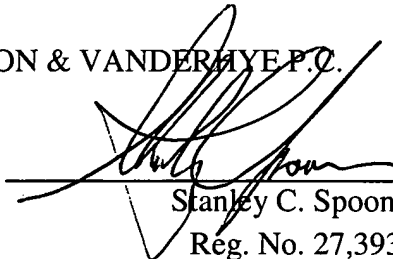
system. Even if the Examiner is correct in his assessment of the Rostoker reference (and this is not conceded by the Applicants), the Examiner has failed to provide any motivation or suggestion for combining portions of the Gupte and Rostoker references in the manner claimed. Additionally, the Examiner has not explained how or why one of ordinary skill in the art would ignore the Gupte teaching away from Applicants' claimed combination. There is simply no basis for rejection of claims 15 and 31 as being obvious over the Gupte/Rostoker combination and any further rejection thereunder is respectfully traversed.

Having responded to all objections and rejections set forth in the outstanding Official Action, it is submitted that remaining claims 1-43 are in condition for allowance and notice to that effect is respectfully solicited. In the event the Examiner is of the opinion that a brief telephone or personal interview will facilitate allowance of one or more of the above claims, he is respectfully requested to contact Applicants' undersigned representative.

Respectfully submitted,

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AMENDMENTS TO THE DRAWINGS

Please substitute the attached seven (7) sheets of replacement drawings for the drawings originally filed.